## WE CLAIM:

A diagnostic system for ozone-splitting catalytic converters comprising:
a catalytic element in contact with a gas flow,

a plurality of heated conductivity sensors for the detection of ozone, wherein at least a first ozone sensor is arranged in the gas flow upstream of the catalytic element and at least a second ozone sensor is downstream thereof, and

further comprising monitoring means to monitor the functioning of the catalytic element by comparing the ozone concentrations upstream and downstream of said element.

- 2. The diagnostic system according to claim 1, wherein the ozone sensors have an operating temperature in the range of about 500 to about 750°C.
- 3. The diagnostic system according to claim 1, wherein the conductivity sensors comprise a gas-sensitive layer of gallium oxide (Ga<sub>2</sub>O<sub>3</sub>).
- 4. The diagnostic system according to claim 3, wherein the conductivity sensor comprises a further layer comprising indium oxide (In<sub>2</sub>O<sub>3</sub>) on at least a portion of the layer of gallium oxide.
- 5. The diagnostic system according to claim 1, wherein the catalytic element is a motor vehicle radiator.
- 6. The diagnostic system according to claim 1, wherein the ozone sensors are each arranged in a housing having a gas-permeable inlet membrane.

NY02:370249.2 -11-

- 7. The diagnostic system according to claim 6, wherein the membrane is an open, porous, hydrophobic polymer membrane comprised of a material selected from the group consisting of polytetrafluoroethylene, polyethylene or polypropylene.
- 8. The diagnostic system according to claim 6, wherein the membrane is comprised of a fiber material.
- 9. The diagnostic system according to claim 6, wherein a plurality of inlet membranes are connected in series.
- 10. The diagnostic system according to claim 1, further comprising evaluation electronics, and the sensor elements together with evaluation electronics are in a common housing.
- 11. The diagnostic system according to claim 1, wherein sensor data is transmitted to an engine management system.
- 12. A method of operating the diagnostic system in accordance with claim 1, comprising maintaining the ozone sensors at the same operating temperatures during a measurement.
- 13. A method according to claim 12, wherein a measuring process is divided into two stages, the ozone sensors in a first stage being kept at the same operating temperatures, and at least one operating temperature on at least one of the ozone sensors being adjusted in a second stage.

- 14. The method according to claim 13, wherein in the second stage of the measuring process the operating temperatures of the two ozone sensors are equal.
- 15. The method according to claims 12 and 13, wherein prior to a measurement it is determined by evaluation of the signal from a first ozone sensor, whether an adequate ozone concentration and an adequate gas flow are present for an appropriate conversion measurement.
- 16. The method according to claim 15, wherein the temperature on the catalytic element is taken into account in making the determination.
- 17. The method according to claim 12, wherein in each measurement a differential signal from the ozone sensors is evaluated.
- 18. The method according to claim 13, wherein the operating temperature is reduced in order to reduce in the second stage transverse axis sensitivities.
- 19. The method according to claim 12, wherein the operating temperature of the sensors is in a range between about 500°C and about 750°C.
- 20. The method according to claim 12, further comprising balancing the sensors' characteristics with one another.
- 21. The method according to claim 12, further comprising controlling of operation as claimed in one of the preceding claims, in the heating of the ozone sensors.
- 22. The method according to claim 19, wherein the operating temperature is about 650°C.

- 23. The method according to claim 1, comprising maintaining the ozone sensors at different operating temperatures during a measurement.
- 24. The method according to claim 23, wherein a measuring process is divided into two stages, the ozone sensors in a first stage being kept at different operating temperatures, and at least one operating temperature on at least one ozone sensor being adjusted in a second stage.
- 25. The method according to claim 24, wherein the operating temperatures of the ozone sensors are equal in the second stage.
- 26. The method according to claims 23 and 24, wherein prior to a measurement it is determined by evaluation of the signal from a first ozone sensor, whether adequate ozone concentration and an adequate gas flow are present for an appropriate conversion measurement.
- 27. The method according to claim 26, wherein the temperature of the catalytic element is taken into account in making the determination.
- 28. The method according to claim 23, wherein in each measurement a differential signal from the ozone sensors is evaluated.
- 29. The method according to claim 25, wherein the operating temperature is reduced in the second stage in order to reduce transverse axis sensitivities.
- 30. The method according to claim 23, wherein the operating temperature of the sensor is in a range between about 500°C and about 750°C.

- 31. The method according to claim 30, wherein the temperature is about  $650^{\circ}\text{C}$ .
- 32. The method according to claim 23, further comprising balancing the sensors' characteristics with one another.
- 33. The method according to claim 23, further comprising controlling the heating of the ozone sensors.